

REMARKS

This application has been carefully reviewed in light of the Office Action dated December 17, 2004. Claims 1 to 60 are in the application, of which Claims 1, 21, 31 and 51 have been amended. Claims 1 and 31 are the independent claims. Reconsideration and further examination are respectfully requested.

In the Office Action, Claims 21 and 51 were objected to for alleged informalities. In particular, the Office Action alleged that the feature of “the first antenna element type” lacked proper antecedent basis, since there was a “first antenna element type” defined for each of the first antenna array and the second antenna array. In response, Claims 1 and 31 have been amended to further clarify that the “first antenna element type” is included in a first region of the first antenna array. Furthermore, Claims 21 and 51 have been amended to further identify “the first antenna element type of the first antenna array,” clearly providing proper antecedent basis for this feature. Reconsideration and withdrawal of the objection to the claims is therefore respectfully requested.

Claims 1, 2, 12 to 14, 16 to 18, 28 and 29 were rejected under 35 U.S.C. § 102(e) over U.S. Patent No. 6,795,020 (“Sreenivas”); and Claims 3 to 11, 15, 19 to 27 and 30 to 60 were rejected under 35 U.S.C. § 103 over Sreenivas in view of U.S. Patent No. 5,838,282 (“Lalezari”). Reconsideration and withdrawal of the foregoing rejections are respectfully requested.

The present invention generally concerns antennas and antenna arrays. A first antenna array includes one or more antenna elements of a first antenna element type of a first region of the first antenna array, and a plurality of antenna elements of a second antenna element type in a second region of the first antenna array.

Turning to specific claim language, amended independent Claim 1 is directed to an antenna, including a first antenna array. The first antenna array includes one or more antenna elements of a

first antenna element type in a first region of the first antenna array, and a plurality of antenna elements of a second antenna element type in a second region of the first antenna array.

Amended independent Claim 31 is directed to a spacecraft, including a spacecraft bus and a first antenna array. The first antenna array includes one or more antenna elements of a first antenna element type in a first region of the first antenna array, and a plurality of antenna elements of a second antenna element type in a second region of the first antenna array.

The applied references are not seen to disclose the foregoing features of the present invention. In particular, the applied references are not seen to teach or suggest the feature of a first antenna array which includes one or more antenna elements of a first antenna element type in a first region of the first antenna array, and a plurality of antenna elements of a second antenna element type in a second region of the first antenna array.

Sreenivas discloses a dual band coplanar microstrip interlaced array antenna, where first and second arrays are interlaced with one another to minimize the surface area of the antenna. See Sreenivas, Abstract; col. 2, ll. 57 to 67; and Figs. 1 and 2. As shown in Figure 2, radiator elements 104 of first array 112 are mounted upon substrate 120, and are interlaced with radiator elements 108 of second array 116. *Id.* Although radiator elements 104 and 108 are coplanar, Sreenivas is clearly seen to include two separate interlaced antenna arrays which each respectively have the same type of antenna elements, and is not seen to include one single antenna array which includes two antenna element types. See Sreenivas, col. 6, ln. 50 to col. 7, ln. 13; and Figs. 1A and 2.

Lalezari is not seen to remedy the foregoing deficiencies of Sreenivas. In particular, Lalezari discloses an antenna system which is capable of multiband operation from a single antenna aperture, the antenna system including at least two separate arrays of antenna elements having a common or overlapping aperture. See Lalezari, Abstract; col. 2, ll. 27 to 35; and Fig. 2. Lalezari is

seen to include a plurality of L-band elements forming a first L-band ring array 32, and a plurality of L-band elements forming an outer L-band ring array 34. See Lalezari, col. 5, ll. 55 to 67; and Fig. 2. Thus, the two types of L-band elements described in Lalezari are seen to correspond to two separate antenna arrays, not a single antenna array.

Accordingly, the applied references, either alone or in combination, are not seen to teach the combination of features of amended independent Claims 1 and 31, particularly the feature of a first antenna array which includes one or more antenna elements of a first antenna element type in a first region of the first antenna array, and a plurality of antenna elements of a second antenna element type in a second region of the first antenna array.

The other claims currently under consideration in the application are dependent from the independent claims discussed above and therefore are believed to be allowable over the applied references for at least the same reasons. Because each dependent claim is deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

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Applicants' undersigned attorney may be reached in our Orange County office by telephone at (949) 851-0633. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read 'D. A. Duchene', with a long horizontal flourish extending to the right.

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